Facilitating the Comprehension of Science Articles by Activating General Knowledge

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Introduction

Why is expository text comprehension important?

- It is **essential for academic achievement**
  - Exposition becomes increasingly important in the 3rd and 4th grades
  - Such comprehension continues to challenge most
- **Obstacles** to the study of expository text comprehension
  - **Complex structures** (*e.g.*, *Compare/Contrast, Problem Solving, Persuasion, etc.*)
  - **Readers must activate** relevant **world/general knowledge**
    - Misconceptions may interfere
    - Readers **must make evaluative** (or "bridging") **inferences** to relate world knowledge to text information (see Millis and Graesser, 1994; Singer et al., 1997; Noordman et al., 1992; and Singer et al.,1997)
- New approaches required to assess:
  - Recall of explicit information
  - Text-based inferences; and
  - **Evaluative inferences**

Purpose of Current Study

- Assess college students' **spontaneous generation of text-based** and **evaluative inferences** when reading science articles and
- **Investigate a method for facilitating evaluative inferences**
  - Find the effectiveness of knowledge activation before reading articles

Predictions

- The activation of knowledge **prior to** reading is necessary for comprehension that depends upon evaluative inferences
- Less effect of knowledge activation will occur for responses to explicit statements and generation of text-based inferences

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Method

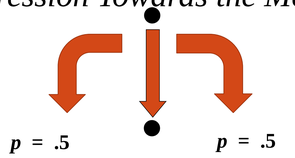
Participants

- UD students

Materials

- Three science articles (each one is about 650 words) were written for use in these experiments
- A training protocol was written for each article to activate general knowledge
  - The figure below illustrates an aspect of training for the article,

Regression Towards the Mean



- 9 test statements (3 from each category) assess readers' comprehension of each article, as follows:
  - (Statements containing) ***Explicit information,*** e.g., "Regression towards the mean occurs when elements of chance influence scores."
  - ***Text-based inferences***, e.g., The top 5% or bottom 5% of scores are generally considered "extreme" scores."
  - ***Evaluative inferences***, e.g., A simple pretest-posttest comparison is sufficient for demonstrating a change due to an intervention strategy*
    *Note: One item in each of the above sets is a false statement such as this

Experiment 1

Procedure. Participants were assigned to either the **Training Before Reading** or **No Training** condition**,** using the articles, *The Evolution of Bipedal Gait* and *Hemispheric Asymmetry and Handedness*, which were counterbalanced with condition

- Following self-paced reading, participants used a 0-10 scale to rate the clarity of the article
- After reading each test statement they reported "True" or "False", and used a 1-10 scale to rate their confidence in being correct
- Comprehension scores were derived from the sum of weighted correct responses (+1 times the corresponding confidence rating) and weighted incorrect responses (-1 times the corresponding confidence rating)

Experiment 2

- Experiment 2 is similar to Experiment 1, but we added one more article *Regression Towards the Mean.* Therefore, each participant was required to read three articles in total
- We also added the condition **Training After Reading**
- The procedure and measures are the same as Experiment 1

Results and Discussion

Implications of Current Findings

- **Evaluative inference–making**, a factor required for the comprehension of expository text, can be facilitated and measured
- Teachers can ensure availability of **world knowledge** required for the comprehension of specific text passages
- Using the current assessment approach, future studies can investigate effects of reading strategies that enhance evaluative inference-making.

References

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